

TFAT FISHERIES SPRING/SUMMER SURVEY SAMPLING GUIDELINES – 2005

All fisheries surveys conducted by the Treaty Fisheries Assessment Team (TFAT) will follow these guidelines. We recommend that these guidelines be followed by all WDNR fisheries biologists when conducting fisheries surveys in ceded territory lakes. Several changes to the sampling protocol were made, beginning in 2005. Some surveys are more comprehensive than others, depending on objectives for a particular lake, but some elements of the TFAT comprehensive surveys conducted before 2005 have been eliminated or modified.

The TFAT conducts fisheries surveys to meet the following objectives for each lake sampled:

- to estimate the abundance of adult walleyes and other selected gamefish,
- to estimate the relative abundance of panfish and non-game fishes, and
- to index the fall abundance of YOY and yearling walleye and muskellunge, and other gamefish.

The first objective is met by conducting mark/recapture surveys during, and shortly after, peak gamefish spawning activity. Gamefish are captured predominately with fyke nets during the marking phase. Marking gamefish of some species is accomplished with a combination of sampling gears. Recapture sampling is done via electrofishing with a boomshocker. The second objective is met by estimating CPUE of panfish and non-game fishes sampled via mini-fyke nets during late summer and by electrofishing with a boomshocker in fall under the baseline lake monitoring protocols. Abundance of YOY and yearling walleye, muskellunge, and other gamefish is determined from CPUE estimates from index sampling conducted via electrofishing in fall, again incorporating the baseline monitoring protocols.

In a typical comprehensive fisheries survey the sampling sequence would progress approximately as shown in Table 1.

Table 1. Timing and temperature ranges for comprehensive fisheries surveys

<u>Survey Component</u>	<u>Timing</u>	<u>Approx. Water Temp</u>
Walleye (Early Spring) Netting	Ice-out to peak walleye spawning	40-50 °F
Walleye Recap Electrofishing Run	Near peak of walleye spawning	45-50 °F
Muskellunge Netting	Near peak of muskellunge spawning	50-55 °F
Bass Electrofishing Run #1	Pre-spawn	55-60 °F
Bass Electrofishing Run #2	Pre-spawn	55-60 °F
Supplemental Bass Marking	See specific guidance below under <i>Optional Elements</i>	
Bass Electrofishing Run #3 (Recap run)	Immediately pre-spawn	60-65 °F
Summer Fish Community	Early August to early September	> 70 °F

Note: Temperature ranges listed above are idealized. Spring warming trends are highly variable. The ranges given above are best approximations. Actual water temperatures of a sample of past surveys fit within those ranges (+ or – 1-2 °F) in nine of ten cases.

OPTIONAL ELEMENTS

Additional Data – Some biologists may wish to collect additional data on fish captured during various phases of comprehensive fisheries surveys. For example, the following data were collected during some past walleye netting: CPUE of panfish and non-gamefish, lengths and/or aging materials of yellow perch, and lengths and/or scales of centrarchid panfish. These are not required elements of that portion of TFAT comprehensive surveys. **It is the responsibility of the fisheries biologist requesting added data collection to inform the survey crew and supply them with supplemental guidance.**

Supplemental Bass Marking – A larger sample of marked bass will improve the precision of bass P.E's. Crews are encouraged to try various other gear and methods to maximize the number of marked bass prior to the recapture run. Possible methods might include pre-spawn fyke netting in appropriate areas, daytime electrofishing, and hook-and-line sampling. Sampling effort should be documented in detail to enable us to evaluate efficiency of various methods.

SURVEY METHODS

I. Walleye (Early Spring) Netting

A. Purpose:

The primary objective of the TFAT for this sampling is to capture and mark adult walleye for use in estimating their abundance. Surveys of waters with low numbers of or no walleye may target northern pike. Some emphasis may be given to both species in many waters. Therefore, substitute northern pike for walleye where appropriate as you apply this guidance. The secondary objective is to mark other gamefish captured incidental to walleye netting. Other targeted sampling of those species will be conducted later in the survey to complete the marking needed to estimate their abundance.

B. Forms:

Gamefish CPE data – **Form 3600-186-CPE/N**

Walleye length, sex and clip data (tallies) – **Form 3600-186-W/N**

Gamefish length, sex and clip data (tallies) – **Form 3600-186-G/N/A1**

Gamefish length, sex and clip data (individual) – **Form 3600-186-G/N/B**

Gamefish scale data – **Form 3600-186-SCALE/G or Form 3600-186-SCALE/M**

Note: Please record **all** appropriate data in the header when filling out a data form.

C. Procedure:

1. General Guidelines

- **Gear** - Set fyke nets at ice-out and run them through the peak of walleye spawning. Water temperature will be approximately 45 °F. Set enough nets to sample most of the walleye-spawning habitat on the lake you are surveying. Remove all nets from the lake prior to the first recapture run.
- **Recording Net Location** - Record net locations on a map of the lake being surveyed. Number all sets and note the dates when nets are moved or added. When a net is moved, a letter should be added to its net number. **Example:** When net 10 is moved to a new location, it should be noted as net 10A.

Use a letter code to designate the species a net was set for. Code walleye net sets “W”. Code muskellunge nets with an “M”. Code northern pike nets with an “N”. And code bass nets with LB for largemouth bass and SB for smallmouth bass. **Example:** If net 10 was originally set for northern pike in a shallow bay, its net number would be 10N. If that net were moved to a gravel point to capture walleyes, its net number would be coded 10AW.

- **Number of Gamefish to Mark** - The objective for marking adult gamefish is to mark approximately 10% of the estimated population. Where no preliminary estimate is available, mark one walleye per acre or one muskellunge per 10 acres. Use professional judgment in setting an objective for marking other gamefish. Netting should continue until that objective is met or exceeded. Marking more than the objective number of gamefish may improve the accuracy and precision of the resulting population estimate. However, it is probably unwise to spend more than one week netting and marking gamefish if the R/C ratio of your catches is 10% or greater.
- **Marking Gamefish** - When marking gamefish with a fin clip (i.e., HRV), make sure that enough of the fin is removed to leave a mark that will be recognizable for an appropriate time interval (i.e., 10 months on lake where creel surveys are planned). Removing about ½ of a fin (Figure 1) will leave a mark that lasts for more than one year. Mark adult gamefish with a primary clip. Mark juvenile gamefish with a secondary fin clip. The secondary mark will be a top caudal (TC) fin clip unless otherwise specified. Release marked gamefish away from nets and inlets or outlets, preferably at a mid-lake location.
- **Gamefish Marked in Previous Years** - Some gamefish captured during netting may carry marks from previous WDNR and GLIFWC surveys. A list of fin clips and/or tags used during past surveys will be provided each year for lakes being surveyed by the TFAT. Process gamefish with marks from previous surveys as you would any unmarked gamefish unless you receive specific direction to do otherwise. Mark them with the appropriate current-year fin clip and record them in the normal (unmarked) column on the data sheet.

- **Special Considerations on Lake Chains** - When surveying a lake in a chain, you may capture gamefish with current-year clips from another lake in the chain. Please record data from gamefish with current-year clips from other lakes in a manner that clearly separates them from data from the lake you are surveying (on a separate form or area of the form). Do not mark gamefish with current-year clips from other lakes with another clip.
2. **Daily Field Methods**
- **Gamefish CPE Data** – Count and record on a gamefish CPE data form the number of each gamefish species, including recaptured gamefish, caught in each net each day. Record the total catch for all nets in the far right-hand column of the data sheet.
 - **Measuring and Marking Gamefish** - Sex, measure for total length (to the nearest 0.1 inch) and mark, with either a primary or secondary fin clip, all gamefish captured during fyke netting. Record length, sex and fin clip data on an appropriate data sheet.

Mark **all** sexable gamefish and unknown-sex gamefish \geq the applicable size cutoff (Table 2) with the primary fin clip for that lake. Mark unknown-sex gamefish $<$ the applicable size cutoff with a secondary fin clip (TC unless other specified). **NOTE THE CHANGE IN MUSKY MARKING PROTOCOL FOR 2005.**

Table 2. Size cutoffs for primary versus secondary clips on unknown-sex gamefish.

	<u>Primary</u>	<u>Secondary</u>	<u>Tertiary</u>
• Walleye	$\geq 15"$	$\geq 7" < 15"$ (TC Clip)	
• Northern	$\geq 12"$	$< 12"$ (TC Clip)	
• Bass	$\geq 12"$	$> 4" < 12"$ (TC Clip)	
• Musky *	$\geq 30"$	Mature fish $< 30"$	Immature fish $< 30"$ (TC Clip)

Additional instructions for musky marking: The tertiary clip (TC) is only to be used as a short-term mark to indicate whether we have handled a fish already during the current spring sampling period. Do not record this mark, and do not record it as a recap each time you catch the same fish. If you catch a musky with a TC clip, you can release it immediately. On chains and trend lakes there will not be enough available fins to use this protocol. In these cases, use only the primary clip on fish 30 inches and larger, and a temporary TC clip on all fish less than 30 inches.

- **Taking Aging Material**
Walleye: Take spines (2nd or 3rd complete spine from leading edge of dorsal fin), five per half-inch group per sex, from all walleye ≥ 12 inches. Take scales from walleye < 12 inches. Take scales from five walleye per half-inch group per sex (including unknowns). Scales must be taken from below the lateral line and just beyond the tip of the pectoral fin (Figure 2). Tally the number of walleye from which you take scales on a gamefish scale data sheet.

Muskellunge and Northern Pike: Take scales from five fish per half-inch group per sex (including unknowns). Scales must be taken from the nape of the fish's neck at the point where the scales are largest (Figure 2). Tally sampled esocids on a gamefish scale data sheet.

Largemouth and Smallmouth Bass: Take scales ($< 12"$) or spines ($> 12"$) from five bass per half-inch group per sex (including unknowns). Scales must be taken from below the lateral line and just beyond the tip of the pectoral fin (Figure 2). For spines, take the 2nd or 3rd complete spine from the leading edge of the dorsal fin. Tally sampled bass on a gamefish scale data sheet.

II. Recapture sampling & Bass P.E. sampling (general protocol for all electrofishing runs)

A. Purpose:

The objectives of the TFAT for this sampling are to recapture gamefish marked in previous sampling for use in estimating their abundance and to mark gamefish for use in later population and angling exploitation estimates.

B. Forms:

Walleye length, sex and clip data (tallies) – **Form 3600-190-W/E1**

Gamefish length, sex and clip data (tallies) – **Form 3600-190-G/E/A1**

Gamefish length, sex and clip data (individual) – **Form 3600-190-G/E/B**

Gamefish scale data – **Form 3600-186-SCALE/G or Form 3600-186-SCALE/M**

Note: Please record **all** appropriate data in the header when filling out a data form.

C. Procedure:

1. General Guidelines

- **Gear** – Use a “three-person” boomshocker to shock the entire shoreline, including islands, of each lake surveyed.
- **Recording Sampling Route** - Mark a map of the lake with the route(s) followed by the crew(s) for each electrofishing run.
- **Marking Gamefish** – Follow the guidance outlined in the walleye netting section (**I.C.1.**) for number of gamefish to mark, marking procedure, handling of previous-year fin clips and special considerations for lake chains.

2. Daily Field Methods

- **Measuring and Marking Gamefish** - Sex, measure for total length and examine for marks all gamefish captured during each electrofishing run. Mark any new (unmarked) gamefish captured with the appropriate current-year fin clips (note size cutoffs in Table 2 above) unless otherwise specified in run-specific guidance. Record length, sex and fin clip data on an appropriate data sheet.
- **Taking Aging Material** – Collect scales or spines according to the species-specific procedures outlined in the walleye netting section (**I.C.2.**). Collect aging material only from gamefish in size ranges needed to complete the collection of 5 samples per ½-inch group for the sampling season. Review the gamefish scale data sheet for the lake you are sampling.

III. First Electrofishing Run – Adult walleye recap run

A. Purpose:

Data from this recapture run will be used to estimate adult walleye abundance and the abundance of other gamefish.

B. Forms:

Use the forms listed in the general protocol for electrofishing runs (**II.B.**).

C. Procedure:

1. General Guidelines:

- **Run-Specific Directions** - Conduct this shocking run near the peak of walleye spawning. Water temperature will generally be between 45 and 50 °F. Remove all fyke nets from the lake at least one day prior to this run. Consult the general protocol for electrofishing runs for other procedures (**II.C.1.**).

2. Daily Field Methods

- **Target Species (Gamefish) Sampling** – Collect and process all gamefish observed. Follow the general protocol for electrofishing runs for measuring, marking and taking aging materials from gamefish (**II.C.2.**). *Continue marking new (unmarked) gamefish.*

IV. Muskellunge Netting (Skip this Section if no Muskellunge PE is Scheduled)

A. Purpose:

The primary objective of the TFAT for this sampling is to capture and mark adult muskellunge for use in estimating their abundance. The secondary objective is to mark other gamefish captured incidental to muskellunge netting. Other targeted sampling of those species will be conducted to complete the marking needed to estimate their abundance.

B. Forms:

Use the forms listed in the walleye netting section (**I.B.**).

C. Procedure:

- **Gear** - Set fyke nets after the first gamefish recapture run through the peak of muskellunge spawning. Water temperature will be approximately 55 °F. Set enough nets to sample most of the muskellunge-spawning habitat in the lake you are surveying. Remove all nets from the lake prior to the second recapture run.
- **Other** – Follow the general guidelines and daily field methods outlined in the walleye netting section (**I.C.1 & 2.**). *Mark only new (unmarked) muskellunge and bass, unless specifically directed.*

V. Bass Electrofishing Run #1

A. Purpose:

The focus of this run will be to mark largemouth and/or smallmouth bass for a population estimate.

B. Forms:

Use the forms listed in the general protocol for electrofishing runs (**II.B.**).

C. Procedure:

- **Run-Specific Directions** - Conduct this sampling approximately 1-2 weeks after the walleye recapture run (at a water temperature between 55° and 60° F). Consult the general protocol for electrofishing runs for other procedures (**II.C.1.**). However, it is not necessary to shock the entire shoreline. You may concentrate effort in areas where catch of bass can be maximized, but you should accurately record the sampling route.
- **Other** – Collect and process all gamefish observed. Follow the general protocol for electrofishing runs for measuring, marking, and taking aging materials from gamefish (**II.C.2.**). *Continue marking new (unmarked) bass and muskellunge only, unless specifically directed.*

VI. Bass Electrofishing Run #2

A. Purpose:

The focus of this run will be to continue marking largemouth and/or smallmouth bass for a population estimate.

B. Forms:

Use the forms listed in the general protocol for electrofishing runs (**II.B.**).

C. Procedure:

- **Run-Specific Directions** - Conduct this sampling as soon as practical after the first bass shocking run if the bass catch in that run was good. Use your judgement based on water temperature trends and bass activity to schedule this run at a time when bass catch rate will be optimized. As in the previous run, it is not necessary to shock the entire shoreline. You may concentrate effort in areas where catch of bass can be maximized, but accurately record the sampling route.
- **Other** – Collect and process all gamefish observed. Follow the general protocol for electrofishing runs for other procedures (**II.C.1. & 2.**). *Continue marking new (unmarked) bass and muskellunge only, unless specifically directed.*

VI. Bass Electrofishing Run #3 (Recapture Run)

A. Purpose:

This is a recapture run for bass population estimates.

B. Forms:

Use the forms listed in the general protocol for electrofishing runs (II.B.).

C. Procedure:

- **Run-Specific Directions** – Conduct this recapture run just prior to the onset of bass spawning if possible, with water temperatures of 65F or less. **Electrofish the entire shoreline.**
- **Other** – Collect only bass and muskellunge (if a muskie PE will be estimated). Consult the general protocol for electrofishing runs for other procedures (II.C.1. & 2.). ***Continue marking muskellunge if a PE will be estimated. Do not mark other gamefish unless specifically directed.***

VII. Summer Fish Community Sampling

A. Purpose:

This sampling is designed to meet the requirements of the late-summer component of the fisheries monitoring section of the Baseline Lakes Protocol. The primary objective is to sample small non-gamefish (i.e., minnows, darters, sculpins, etc.) to round out the species list for each lake sampled as a measure of fish species richness. Secondary objectives are to estimate the relative abundance and size distribution of juvenile panfish, gamefish and small non-gamefish species.

B. Forms:

Panfish/non-gamefish/gamefish length and count data mini-fyke – **Form 3600-186-PNG/N/A**

Note: Please record **all** appropriate data in the header when filling out a data form.

C. Procedure:

1. Mini-Fyke Netting

- **Gear** - Use mini-fyke nets that approximate the following recommendations from the Baseline Lakes Protocol: Recommended nets have two 3'x2' frames (3'x3' frames are also acceptable), four 2'-diameter hoops spaced 2' apart, and a 30"x 2' lead. Adjust lead length to the area you are setting. Nets used should be 3/16"-mesh, with 1"-mesh exclusion netting.

Set mini-fyke nets for **one 24-hour period** in early August to early September at water temperatures >70 °F. An additional day of mini-fyke netting is **optional** at the discretion of the biologist. On lakes < 500 acres, set 6 nets, and on lakes > 500 acres set 8 nets. Stratify gear placement to cover the major habitat types available in the lake you are sampling. Set one replicate (two nets) on each major habitat type. Record net locations on a map as outlined in panfish netting guidelines (VIII.C.1.).

- **Counting and Measuring Fish** – Measuring fish is **optional** at the discretion of the biologist. Count all fish captured by species. Segregate counts of YOY fish of each species from fish of other age groups. Record fish lengths, counts and count sums **by net** on a panfish/nongame/gamefish netting sheet.

FALL ELECTROFISHING PROCEDURES WILL BE COVERED IN A SEPARATE DOCUMENT